MODULE 4

SUSTAINABLE PROJECT PLANNING

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OBJECTIVES:

- To review the definition of "Sustainable Project Planning" as it relates to environmentally sound tourist facility design & development.
- To describe the importance of planning in its role in project development.

OVERVIEW:

- Pre-Project Planning: principles, site selection, site, assessment inventory, tools and techniques.
- Site Planning: applying carrying capacity instrument, completed sustainable development masterplan, final Building siting.

INTRODUCTION

"Sustainable Site Design requires holistic, ecologically based strategies to create projects that do not alter or impair but instead help repair and restore existing site systems."

A sustainable approach to sound tourism facility design and development ensures that the continued development of the primary economic engine of the region - tourism - evolves in a way that enhances, rather than degrades, the quality of life, the natural beauty, and the critical natural systems of the region.

A sound comprehensive planning approach is important to low-impact, environmentally-sensitive tourism development.

Planning is essential as it:

- provides the conceptual and functional framework for a sound approach that considers all the variables before a construction commitment is made.
- provides the necessary forum for decisions to be made on specific elements of what constitutes sustainable, low-impact development and how they can be achieved.
- identifies the sensitive natural elements that need to be taken into account and provides an opportunity to ensure that those elements become assets to the project.
- identifies opportunities for the development project over a broad spectrum of parameters and values - for building and infrastructure design, for programmatic and visitor experience enhancement, and for community interaction and benefit
- allows for a smooth regulatory and review process to work for the development project rather than emerging as an impediment to the development schedule
- yields a sense of confidence on the part of all stakeholders, shareholders and regulators that the project in question is indeed vested with the very best opportunity for success, and in this process builds a much broader base of support throughout all affected sectors and disciplines.

Planning entails:

I. Pre-Project Planning
II. Site Specific Planning

Pre-Project Planning

To accomplish the goals of sustainable tourism means pursuing a commitment to certain fundamental principles from the very beginning, during the conceptual pre-design planning.

Guiding principles to remember in the pre-project planning process include:

- Development projects must be environmentally sound.
- Development projects must be culturally sound.
- Development projects must be financially sound.
- Development projects must contribute to the conservation of the resources upon which they are based.
- Development projects must include an

Site selection is a key factor in the pre-planning process.

It involves the following tasks and centres around formulating and reviewing an inventory of potential sites, prior to making a final selection:

- Developing and reviewing an inventory of potential sites.
- Review of Government land regulatory information (i.e. zoning, maps, land & water use plans, flood plain maps, etc.)
- Financial analysis and feasibility studies.
- "Sustainability ranking" of potential site (initial site environmental survey)
- Negotiations and procurement of selected site.

An ideal assessment inventory for a given site should include information on:

Natural Resources

- environmental systems
- terrestrial and marine resources
- land use patterns
- available digital information
- protected areas and parks

Cultural & Historic Resources

- nature of local communities
- cultural traditions
- community leaders
- demographic information

Natural Hazard Assessment

- site vulnerability
- data on impacts from past events

Special Site Features

- interesting, unique or unusual sites
- tourism and visitor assessment and research
- tourism profile
- level of return visitation
- type of facilities and attractions
- sensitivity to intrusion

The Present/Future Availability of Necessary Support Infrastructure

- electricity
- potable water
- solid waste disposal facilities
- wastewater treatment facilities
- transportation

Tools and techniques which may be used in compiling the inventory and assessing site potential include conducting a **Rapid Ecological Assessment** of the site and compiling and making use of basic computer inventories and Geographical Information Systems (GIS) databases, whenever possible.

Site- Specific Planning

Following site selection, Site Planning is the next important and penultimate step in the planning exercise. It involves assessing the carrying capacity of the site, completing the sustainable development master plan and formulating a site layout plan.

The carrying capacity of an area refers to the potential of the area to sustain a population of animals (including humans) without exhaustion of the natural resources, deterioration of the quality of the environment, or the well-being of the individuals within the population.

This obviously refers not only to the direct consumption value of the area, but also to its ability to assimilate wastes, as well as maintain its life-supporting processes. As such, many attempts to plan for the optimal level of use of resources, especially the use of areas for recreation and tourism, include an attempt to determine the carrying capacity of the targeted resource or area.

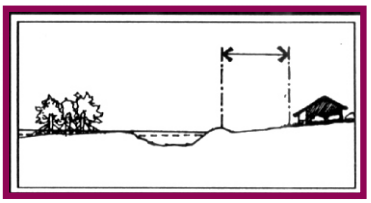
Factors that have to be considered in the determination of carrying capacity of an area include the following:

Site Vulnerability: Areas will have different levels of exposure to natural hazards (storms, etc.) and anthropogenic impacts. Similarly, the level of exposure will vary with seasons, pattern of human activity (if a factor), and the "openness" of the site.

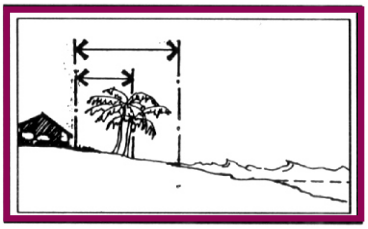
Resource Sensitivity: Resources have different physical and/or biological attributes (grain size of sand, slope of beach, population size, natural history of wildlife, etc.), and therefore different levels of sensitivity. As such, different resources react differently to even the same patterns of use.

Patterns of Use: Different types and levels of use have different impacts. Additionally, some agents which cause degradation act synergistically. The effect over time is important, as the impact may affect different parts of a system at different rates and in different ways. The presence of other activities in the same area is another factor to consider. As such, in some cases the issue of cumulative impacts becomes extremely important.

Tourism-specific Factors: Tourism utilises many different attributes of the environment; access, aesthetics, wildlife, recreational potential, etc. Each attribute has a different level of response to a particular type and level of use. Use levels must therefore consider the mix of uses that will be permitted in an area.



Socio-cultural Factors: Different cultures, or even different communities in one culture, have different modes of interaction, different values, and different levels of sensitivity to change. The cultural norms of host communities must therefore be a major consideration if conflicts are not to occur.



The main objective and focus of the Sustainable Development Master Plan is to reduce projected operational costs and increase project profitability. It should address the infrastructural/engineering, social and economic needs of the project. It should also seek to ensure the sustainability of the physical, ecological and biological resources on the site and within the region.

A sensitive and informed site layout is important for ensuring the goals and objectives of the Sustainable Development Master Plan and the recommendations of the carrying capacity study are realized in the implemented project. Site layout ultimately determines whether a project will be

environmentally sustainable and sound. It generally guides the project implementors and the construction contractor during the construction phase of the project shaping the final output of their exercises/work.

Setback from mangrove or wetlands. A good site layout plan should seek to translate the goals and objectives of an equally well prepared Sustainable Development Master Plan into a graphical and descriptive tool that can be understood and used by the project implementors.

Setback from ocean, high water and beach. Primary challenges of formulating a sustainable site layout plan include preventing/minimizing habitat damage and extreme physical changes to the site's environment which would disrupt regular system dynamics on the site (e.g. slope stability, stream/gully channeling, etc.) resulting in avoidable natural hazards (landslides, flooding, soil erosion, etc.). Examples of sensitive habitats or resources which should be given due consideration in formulating a site layout plan include beach, wetlands and pristine forested communities and historic and cultural resources. Suitable building setbacks from these habitats and resources are usually adequate for preserving the latter sites.

Details on integration and location of the support infrastructure (wastewater facilities, water supply pumps and mains, craft villages, etc.), addressed in the Sustainable Development Master Plan may also be captured graphically and descriptively in the site layout plan.

CARRYING CAPACITY ASSESSMENT

A **Carrying Capacity Assessment Instrument** for Caribbean Coastal Environments is currently being developed (by Caribbean Infra-Tech Inc.), as a set of easy-to-use tools to provide professionals involved in the design and development of coastal projects in the Wider Caribbean Region with a simple and practical instrument to estimate the maximum recommended building density for a site.

The main purpose for this instrument is to offer the developers, planners, architects, and other professionals who determine the size, location, and layout of coastal facilities, a simple way to establish the base area or "foot print" of a proposed facility and the maximum occupancy levels for a special project feature that are within the environmental carrying capacity of the site/location.

Site building density is calculated on a numeric value determination of two key indices: the Index of Natural Resource Density and the Index of Environmental Vulnerability.

The Index of Natural Resource Density is determined by summing the numeric values assigned to issues of biodiversity (in the form of vegetation and wildlife vulnerability) and historic and cultural resources.

The Index of Environmental System vulnerability is determined by summing the numeric values assigned to factors involving soil erosion (using the Universal Soil Loss Analysis Method), beach erosion (determined by marine biology site studies and historical data), existing impacts (including erosion patterns,

vegetation damage levels, existing building areas and impervious cover, human and livestock/animal waste levels), and finally, natural hazard impact potential (including hurricane, wind storm, tidal wave, coastal flooding and earthquake impact potentials).

When all of the instrument factors are compiled, a geographical index indicating preferred building density and activity yields that emerges can be applied to any site. On-going efforts are continuing to further develop and validate this instrument so that it is tested and ready for use in the Wider Caribbean Region. Monitoring and adjustments will be critical to ensure that the instrument is performing as designed for any specific site.

Limits of Acceptable Change

The concept of **Limits of Acceptable Change** (LAC) has been forwarded as either an alternative or an addition to the basic concept of carrying capacity. LAC is a system for establishing acceptable and appropriate resource and social conditions in tourism and recreational settings. LAC focuses more on the conditions desired in the area under consideration for development or activity rather than how much use the area can tolerate.

When applied properly, this approach offers opportunities for participation to a broad cross-section of the interested and affected community, including planners, resource managers, developers, local residents, policy makers, regulators and non-governmental organizations.

The LAC approach involves nine steps, many of which coincide with other aspects of the information-gathering and planning processes.

Step 1: Identify the range of concerns and issues.

Step 2: Define and describe the development opportunities.

Step 3: Select indicators of resource and social conditions for monitoring purposes.

Step 4: Complete inventories of natural, cultural, social, historic and programme opportunity resources and conditions.

Step 5: Specify standards for these conditions as ideal situations and either need to be maintained, be minimally impacted or enhanced.

Step 6: Identify a palette of management or development actions for each strategy.

Step 7: Identify strategies for development and activity.

Step 8: Evaluate and select the actions that are deemed more appropriate.

Step 9: Implement the strategy and monitor the impacts.

Visitor Impact Management

The Visitor Impact Management (VIM) framework includes an seven-step approach for assessing and managing visitor impacts. The steps are designed to help deal with three basic issues that are inherent to impact management:

1. The identification of problem conditions
2. The determination of potential causes and severity of unacceptable impacts

3. The development of management strategies for improving or mitigating unacceptable impacts.

Step 1: Pre-assessment database review

Step 2: Review of management objectives

Step 3: Selection of key indicators

Step 4: Selection of standards for key impact indicators

Step 5: Comparison of standards to existing conditions

Step 6: Identification of probable causes of impacts

Step 7: Identification of selected strategies

The main factor driving this process is some working recognition of the fact that sites do have a carrying capacity limit beyond which unacceptable environmental, social, or cultural impacts will result. The goals are to identify the limit in the planning strategies of a project and to design ways to mitigate the impacts and monitor the effectiveness of the mitigation efforts.

Rapid Sustainability Assessment Process (RSAP).

The Rapid Sustainability Assessment Process has been developed by Caribbean Infra-Tech Inc. as a way to immediately and effectively determine what is most likely the best integrated approach to utilize low impact infrastructure and renewable and responsible energy, water and waste treatment technologies. The RSAP approach utilizes basic computer modeling techniques to complete an intensive, on-site transectoral assessment that involves five basic steps.

Step1: Review baseline planning documents, programme plans, resource inventories and other available resource information.

Step 2: Complete formal site interviews with project managers and other stakeholders and interested and affected parties.

Step 3: Gather baseline resource data using specially developed and easily deployed computerized wind and radiation sensing and logging equipment.

Step 4: Complete integrated infrastructure assessment, including energy supply and loads, solid and liquid waste loads and treatment alternatives, and transportation and access issues.

Step 5: Complete Preliminary/Final Recommendations and Plans.

Once the steps are completed, master planning alternatives for each element can be constructed and presented for overall project evaluation and, eventually, implementation.

Environmental and Financial Feasibility

Feasibility Studies constitute another important link in the matrix of performance-based evaluation criteria that are useful to a range of perspectives on any particular project. They provide a means for regulators and affected stakeholders to assess the relative impacts and chances for the success of a development project. Apart from the

standard business feasibility studies that should be performed by developers, an environmental feasibility study should also be completed to help ascertain whether the inherent environmental risks of development are within the acceptable limits.

Disaster Mitigation

The inclusion of disaster mitigation planning in the early stages of project planning not only helps to ensure survival and rapid recovery from high-magnitude events but, in fact, helps to make the development venture more sound in general.

Disaster mitigation planning takes into account two levels of long-term survival:

1. **High magnitude event mitigation** - planning for the worst possible scenario. These must be engineering-intensive to minimize environmental damage and optimize recovery period.
2. **Low magnitude event mitigation** - responsible and detailed site planning and design. This is necessary especially in areas prone to beach-related erosion. Most Caribbean coastal areas require rigid setbacks to provide buffers needed between the built environment and the natural coastal systems.

Master Site Planning

Master Site Planning is the process of merging all of the work done to this point into a master plan for the physical development of the site. It identifies and locates the natural features of the site that need to be protected, preserved, enhanced or restored, it identifies and locates all buildings and infrastructure, it identifies and locates all activity areas, and it locates all roads and points of access, both internal and external.

One technique that represents a resource-based site design and plan, rather than development-driven one, is an adaptation of what is called the Growing Greener Approach for use in environmentally-sound tourism facility development.

Essentially, this approach begins with an identification of what needs to be protected, and follows a four step process that yields a development plan that emerges from the existing natural systems.

Step 1 Identify the resources that should be permanently protected by creating a Map of Potential Conservation Lands and precisely locating features to be conserved, both on site and on adjacent sites that could be impacted. This involves first identifying all constrained lands (wet, steep, floodprone, etc.) as Primary Conservation Areas, then identifying as Secondary Conservation Areas features of the site that are noteworthy but necessarily protected by regulation (mature forest, greenways and trails, river and stream corridors, wildlife habitats, nesting trees or trees of special note, historic sites and structures, scenic viewsheds, etc.). Everything that remains becomes the Potential Development Area(s).

Step 2 Identify points of access to the site.

Step 3 Locate sites for buildings and infrastructure within the Potential Development Areas in such a way as to maximize their relationship with the protected features of the site. This works in concert with carrying capacity assessments. Be sure to differentiate between "front of the house" facilities and "back of the house" facilities. Setbacks come into the picture here in a major way, with primary considerations including prevention of habitat damage and prevention of extreme physical changes that can result from regular system dynamics and major natural events.

Step 4 - 'Connect the dots" with roads and trails.

Completing the Sustainable Development Master Plan

A Sustainable Development Master Plan represents the development of an integrated approach to using sustainable, low-impact techniques and technologies. Like the master site plan, the sustainable development master plan differs from the traditional approach to master planning in that it emerges from a commitment to working with the site and its natural systems to achieve the goals of environmentally-sound development. It recognizes the opportunities and limitations presented by the site, and builds upon them to yield the desired results.

In addition to representing a key component of the sustainable development picture, a sustainable development master plan yields additional benefits. These include:

1. The reduction of projected operating costs and increased project profitability.
2. The assurance of environmental soundness for and to all interested and affected parties, stakeholders and shareholders.
3. The creation of opportunities for education and research.
4. Increased opportunities for the restoration and enhancement of natural systems.

Building upon the work pursued in the pre-project planning phase to complete a rapid sustainability assessment, the sustainable development master plan provides detailed planning information that can be used in the final design of systems infrastructure. It involves the following six steps:

1. Estimation of start-up and multi-year power demands (as total watt hours per month-year of electricity), potable water demands (as gallons per month/year of potable water), and waste volumes generated (as cubic feet of water per month/year).
2. Development of a sustainable electric power supply plan, including plans for energy conservation, renewable energy systems, and all other basic aspects of sustainable power supply.
3. Development of a sustainable potable water supply plan. This involves an integrated assessment of volume of water available for withdrawal among various supply sources, comparative water quality for each of the various

sources, and potential storage capacities associated with various sources.

4. Development of a sustainable waste treatment/recycling plan.

5. Completion of a sketch plan of major designs and provide rough cost estimates of each of the systems.

6. Completion of a final master plan document that includes detailed engineering, sizing and systems designs.

Final siting of buildings and infrastructure

The final siting of buildings and infrastructure merges conceptual, master site and sustainable development plans into working designs. It represents the culmination of an exhaustive planning process that will serve as the primary tool in shaping the nature and character of the development and the foundation for the actual engineering and construction of the facility. Once this final siting is completed, with all of its attendant detail, the final engineering, landscape, architecture and architectural design work can processed, leading to the working construction drawings and, finally, the completed facility, opened doors, and first visitors.

Final review and other considerations

Of course, the work is not yet done. Once the final siting plans are in place, they should be made available for a final review to see if the integrated plans that have emerged have properly addressed all of the issues identified and addressed in the individual planning components that preceded. This Review should focus on the following :

1. Natural Resource Protection

2. Carrying Capacity Assessments

3. Environmental and Financial Feasibility

4. Disaster Mitigation

5. Historic and Cultural Resource Preservation

6. Other issues, opportunities and challenges that may emerge, including opportunities for research and education.